HONOLULU
LA JOLLA
MONTEREY
TIBURON

SOUTHWEST FISHERIES CENTER

MONTHLY REPORT - JUNE 1980
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SOUTHWEST FISHERIES CENTER
LA JOLLA, CALIFORNIA

HONOLULU LABORATORY
LA JOLLA LABORATORY
TIBURON LABORATORY
PACIFIC ENVIRONMENTAL GROUP

MONTHLY REPORT - JUNE 1980

STATUS OF PUBLICATIONS

Published

Mendelssohn, Roy. 1980. Managing stochastic multispecies models. Math. Biosci. 49:249-262. Qualitative properties of optimal policies for stochastic, multispecies harvesting models are described. Conditions that imply that a k-species model can be decomposed into k single species models are discussed. For a discrete, stochastic version of the Lotka-Volterra models, it is shown that finding an optimal policy can be narrowed to finding the globally optimal harvest, and to using constraints developed on the partial derivatives of an optimal policy to accelerate computations. For a discrete stochastic version of a competition model developed by Silliman, it is proven that knowledge of the globally optimal harvest is sufficient to completely describe an optimal policy. Approximate policies that are easier to solve are suggested. The results suggest that an optimal harvesting policy will tend to simplify the ecosystem--that is harvest to low levels unwanted or less valuable species.

Yong, Marian Y. Y., and Jerry A. Wetherall. 1980. Estimates of the catch and effort by foreign tuna longliners and baitboats in the Fishery Conservation Zone of the central and western Pacific, 1965-77. NOAA Tech. Memo. NMFS-SWFC-2, 103 p.

Yoshida, Howard O. 1980. Synopsis of biological data on bonitos of the genus Sarda. NOAA Tech. Rep. NMFS Circ. 432, 50 p.
Published and unpublished information on the biology and resources

THIS REPORT DOES NOT CONSTITUTE PUBLICATION AND IS FOR INFORMATION ONLY.

of the three species of Sarda, S. australis, S. chiliensis, and S. sarda, are compiled, reviewed, and analyzed in the FAO species synopsis style.

Approved by Center Director

Perrin, W. F., E. D. Mitchell, J. G. Mead, D. K. Caldwell, and P. J. H. Van Bree. Stenella clymene, a rediscovered tropical dolphin of the Atlantic. For consideration for publication in the Journal of Mammalogy.

Webb, P. W. The effect of the bottom on the fast start of a flatfish Citharichthys stigmaeus. For consideration for publication in the Fishery Bulletin, U.S.

Webb, Paul W. and Raymond S. Keyes. Division of labor between median fins in swimming dolphin fish. For consideration for publication in Copeia.

Hunter, John R., Sandor E. Kaupp, and John H. Taylor. Effects of solar and artificial UV-B radiation on larval northern anchovy, Engraulis mordax. For consideration for publication in Photochemistry and Photobiology.

Kaupp, Sandor E. and John R. Hunter. Photorepair in larval anchovy, Engraulis mordax. For consideration for publication in Photochemistry and Photobiology.

Translations

Nikkan Suisan Tsushin. 1980. Good performance continues in the southern water purse seine fishery...Four "northern" seiners also make good catches (Nanpo makiami koseiseki tsuzuku...Kita makiami yon-kato mo kogyokaku). Nikkan Suisan Tsushin No. 8677:4, April 24, 1980. (Engl. transl. by Tamio Otsu, 1980, 2 p., Transl. No. 47; available Southwest Fish. Cent., Natl. Mar. Fish. Serv., NOAA, Honolulu, HI 96812.)

Administrative Reports

Honolulu Laboratory

Wetherall, Jerry A., and Marian Y. Y. Yong. Exploitation of North Pacific albacore by Korean and Taiwanese longliners based in American Samoa. SWFC Admin. Rep. No. H-80-9.

HONOLULU LABORATORY

INSULAR RESOURCES INVESTIGATION

Insular Ecosystem Study Researchers Plan and Participate in Additional Field Work

Richard N. Uchida, Leader of the Insular Ecosystem Study, completed preliminary cruise instructions for cruise 80-04 of the NOAA research vessel Townsend Cromwell, and began planning for cruise 80-05. Uchida also worked with James H. Uchiyama, Fishery Biologist, to prepare contract specifications for a "piggyback charter" on the University of Hawaii Sea Grant (UHSG) Program's charter cruise of the FV Easy Rider. Uchida and Uchiyama completed the cruise instructions for the charter, which includes experiments to determine the effects of intensive fishing on a small bank or seamount, observations on lobster predation by carangids and sharks, and the tetracycline marking of snappers and groupers caught during the charter.

Bernard M. Ito, who will be Chief Scientist on Part II of Townsend Cromwell cruise 80-03, and Research Assistant Darryl T. Tagami departed Honolulu on June 28 for Midway where they will board the Cromwell.

Research Assistant Robert B. Moffitt departed June 16 on the fishing vessel Easy Rider Too as an observer. The Easy Rider Too will be handling fishing and trapping lobsters in the Northwestern Hawaiian Islands (NWHI).

Analysis of Biological Samples and Data Continues

Dr. Jeffrey J. Polovina, Statistician, completed analysis of data collected on research and charter cruises to the NWHI concerning gear competition among lobster traps. The results showed a relationship between catch per trap and trap spacing. At current lobster densities in the NWHI, polovina found 20 to 25 fathoms the minimum spacing to achieve maximum catch per trap.

Research Assistant Robert L. Humphreys continued his study of the diet of kahala, Seriola dumerili. Humphreys found that some of the stomachs of fish caught recently off the island of Hawaii contained a high percentage of a deepwater lutjanid, Symphysanodon maunaloae, which has been caught by bottom trawls in water to 200 fathoms around Necker Island.

* * * * * * * * * *

B. Ito sampled 192 kahala ranging from 0.68 to 20.41 kg for ciguatera. Of the 192 sampled, 49 (26%) fish ranging from 1.36 to 11.57 kg were rejected.

FISHERY MANAGEMENT PROGRAM

Work Continues on Fishery Surveys

Gary L. Kamer, Statistician, worked with the staff of Survey and Marketing Services, Inc. (SMS) to prepare a final version of an enumeration form for a survey of wholesale fish dealers in Hawaii. Kamer also prepared a request for proposal (RFP) for an inventory of commercial and recreational fishing vessels in Hawaii, Guam, American Samoa, and the Northern Mariana Islands.

Skipjack Tuna Landings Continue Below Long-Term Average

The June 1980 Hawaii landings of skipjack tuna were estimated at 169 metric tons (MT), which is 189 MT below the June 1979 landings and 428 MT below the 1964-79 long-term average for June. The cumulative landings from January through June were estimated at 676 MT, which is 513 MT below the 1979 landings for the same period and 856 MT below the 1964-79 long-term average for the same period.

PELAGIC RESOURCES INVESTIGATION

All Systems Primed for Tuna Spawning Work

Research Assistant Thomas K. Kazama reports that all components of the system are ready for conducting experiments to induce tunas to spawn and to rear the resulting larvae. Dr. Calvin Kaya, Montana State University, who successfully induced kawakawa to spawn last year, has arrived to join the team of investigators.

Research Assistant Henry Kishinami has been monitoring the development of the ova of skipjack tuna landed at the Bumble Bee Seafoods Cannery. Kishinami reports that the average diameters of ova sampled decreased from 0.573 mm to 0.437 mm during the first half of June. This may indicate a conclusion of a spawning period and that another spawning period will be forthcoming soon.

Research Assistant Martina K. K. Queenth reports that ova diameters of captive kawakawa at the Kewalo Research Facility have decreased from last month. Mean ova diameter decreased from 0.290 to 0.229 and the largest ova diameter observed this month was 0.421 mm, which is not large enough to begin injections to induce spawning.

Research Assistant Sharon D. Hendrix continued to maintain phytoplankton cultures of Tetraselmis sp. and Chaetoceros sp. and rotifer

cultures of Brachionus plicatilus. She is also training Research Assistant Linda Barraclough to assist in maintaining the cultures.

Live skipjack tuna were received and biopsied during the month. The biopsy indicated that the females had recently spawned; they all had mature residual ova in the ovaries. The largest developing ova ranged in size from 0.36 to 0.50 mm in diameter. Although the fish were not ready for induced spawning, trials to test and improve procedures were run. In the first hormone treatment test, all 4 fish died within 24 hours. The test was repeated the following day and one of the two females died within 24 hours. The test was terminated after 48 hours. Two males responded to the hormone treatment by producing fluid milt and the surviving female may have responded by producing "green" eggs.

Skipjack Tuna Spawn Spontaneously in Shoreside Tanks

After 13 live skipjack tuna were delivered to the Kewalo Research Facility at about 11 p.m., June 28, evidence of spontaneous spawning in the holding tank was observed before 6:05 a.m. the following morning in the form of approximately 110,000 ripe ova found in a strainer from the tank, reported T. Kazama, leader of the project. Less than 50 of the approximately 110,000 ova appeared fertilized, however. The first of the embryonic development from among the fertilized ova were observed at 8:40 a.m., approximately 2-1/2 hours after discovery of the ova in the strainer. Following the discovery of the spontaneous spawning, the skipjack tuna were biopsied to determine which of the specimens were ripe. Ova from a ripe female were stripped and mixed with milt from a ripe male at 8:55 a.m., June 29. The approximately 6,000 fertilized ova thus obtained were placed in the hatching facilities and their embryonic development is presently being monitored.

Green Turtle Nesting Behavior Under Investigation

Lt. Howard A. Jemison, NOAA Corps, Research Assistant Steven Kramer, and Dr. Andrew E. Dizon, Leader, Pelagic Ecosystem Study, are presently investigating the nesting behavior of green turtles, Chelonia mydas, at the French Frigate Shoals Wildlife Refuge. The study involves the deployment of radio tracking transmitters on turtles to obtain movement and temperature information during periods between nesting activities. Turtles will be tracked by triangulation from two shore-based stations located about 7 miles apart at Tern Island and East Island; temperature will be telemetered using pulse rate modulation. Other team members of the 3-week expedition include George H. Balazs, University of Hawaii (UH) Institute of Marine Biology, and Dr. G. Causey Whittow, UH Department of Physiology.

On June 10, the team tagged eight turtles (four males and four females). Seven of the turtles have been continuously tracked for the

past 2 weeks. The eighth, a male, left the area after the first week. The investigating team is scheduled to leave French Frigate Shoals on July 1.

Tuna Behavioral Thermoregulation Experiments Continue

Dr. Dizon and M. Queenth continued the experiments designed to determine temperature preference of yellowfin tuna. A third fish has successfully regulated tank temperatures and another yellowfin tuna is undergoing preliminary training. The mean temperature preference of the three fish tested to date are shown below.

Fish	Mean day temperature (°C)	Mean night temperature (°C)	Mean day and night temperature (°C)
A	27.77±1.00	26.53±1.46	27.10±1.41
D	27.07±2.06	26.20±2.60	26.66±2.37
E	27.78±2.14	26.36±1.20	27.09±1.89

Tuna Olfaction to be Studied

Dr. Richard Brill, Pacific Gamefish Foundation, Walter Ikehara, UH Department of Zoology, and Dr. Dizon have completed the construction of a laboratory system at the Kewalo Research Facility for recording the neural activity in various brain structures and sensory organs in tunas. The experiments are designed to examine the induced neural activity in the olfactory bulb of skipjack tuna and yellowfin tuna after the fish's olfactory rosettes have been infused with natural prey and artificial odors. The object of the research is to develop a simple artificial odor to attract tuna and enhance their feeding activity.

Operations of American Samoa-Based Longline Fleet Analyzed

Dr. Jerry A. Wetherall, Leader, Stock Assessment Study, and Marian Y. Y. Yong, Mathematician, completed an analysis of catch and effort data of American Samoa-based longliners operating in the North Pacific. Although the American Samoa-based fleets from Taiwan and Korea still fish mostly south of the equator in the South Pacific albacore grounds or in equatorial waters, a small number of fishing trips have been made in the northern winter into the mid-latitudes of the North Pacific in recent years. North Pacific albacore comprise most of their catch in the area between lat. 10° and 35°N. Wetherall and Yong summarized the results of their study in an Administrative Report for presentation at the 5th North Pacific albacore workshop to be held in La Jolla from June 30 to July 3.

DATA MANAGEMENT AND TECHNICAL SERVICES (DMTS)

Research on Federal and State Laws Conducted by Personnel

Relative to the implementation of the Fishery Information Network (FIN) in Hawaii, David L. Lau, Data Technician, researched and compiled Federal and State laws and regulations regarding confidentiality of fisheries data and their implications on current or future data exchange and systems development. Among the material Lau examined were NOAA directives and circulars on confidentiality of data, the Hawaii Revised Statutes, Code of Federal Regulations, West's General Digest, and Legal Periodicals.

In a continuing effort to upgrade and reorganize the Honolulu Laboratory data bank, Sally H. Kuba, Computer Programmer, was aided by Wayne Ogata, Computer Aid, Young Adult Conservation Corps (YACC), and Thomas Shigeta, Data Technician, with data entry and data base management reports.

James E. Kennedy, Computer Aid, assisted Hazel S. Nishimura, Librarian, in compiling a complete reference set of the Honolulu Laboratory's Administrative Reports.

Colleen Nakato, Computer Aid, YACC, worked with 1) Lucille T. Tsukano to design and write data base reports which track the status of computer work requests submitted by Honolulu Laboratory personnel; 2) S. Kuba to recreate the Laboratory's historical cost and billing records from the UH Computing Center for the latest SWFC ADP requirements survey; and 3) Ray F. Sumida, Fishery Biologist, on a file of notification and alert procedures which will interface with the work request file and inform users, through reports, of the status of data sets.

Research Assistant Nathaniel Shippen prepared computer summarizations of Japanese longline catch and ex-vessel price data for billfishes and tunas caught in the Fishery Conservation Zone around Hawaii. Research Assistant Alan R. Everson completed literature searches on the Northern Mariana Islands and continued the keyword indexing work started by Research Assistant Andrew J. Aldridge.

Systems Development Activities Continue

While in Washington, D.C., George W. T. Liao, Operations Research Analyst, arranged demonstrations and briefings by various word processing vendors, particularly with regard to the compatibility of various word processors with the NBI System II and Model 3000 at NMFS headquarters. These demonstrations and briefings were arranged because of the lack of equipment and expertise among the vendors in Hawaii.

Liao discussed the CAMAC shipboard sensor package with Chuck Dinkel and Bill Faulkenberry of Fleet Operations, National Ocean Survey, and visited Washington Science Center to observe a CAMAC and PDP-11 in operation.

To maintain contact with the home office and conduct business while traveling, Liao used the DEC-10 and various terminals in the Washington, D.C. area and he communicated and conducted business with the Honolulu Laboratory staff, assisted by Lynn Hondonero, Computer Aid, YACC.

At NMFS and NOAA headquarters, Liao met with staff to discuss the details and impact of the newly awarded 8-year NOAA contract for computer time-sharing services (to ADP Network, Inc.) on the Honolulu Laboratory operations. There he reviewed various distance-sensitive problems with Gordon Baskerville (Fx3), Jim Davis and Hoyt Wheeland (F/SR4), Margo Kelly (OCMS), and Don Stallone (W511), who were interested in using the ADP Network as a backup system for the Pacific Tsunami Warning Network.

Data Management and Technical Services
Personnel Assist in Data Collection Study

G. Liao and R. Sumida were interviewed by Dr. Robert G. Nagler, System Planning Corporation, Arlington, Virginia, for a design study concerning data collection for the Foreign Fishing Vessel Observer Program. The study is to assess the costs and benefits of low-cost, portable data terminals, which would be used by observers to collect and transmit fisheries and environmental data on foreign vessels fishing in the U.S. Fishery Conservation Zone.

LA JOLLA LABORATORY

Coastal Fisheries Resources Division

ALBACORE FISHERIES PROGRAM

Indications Point to Good Fishery for Albacore in 1980

According to Dr. Michael Laurs, leader of the Albacore Fisheries Investigations, the outlook for the 1980 U.S. albacore fishery is generally good. Albacore are expected to be available in waters off northern Baja and southern California by early July under favorable fishing conditions. However, a late arrival of the "northern" group(s) of albacore that are caught by the U.S. fishery off the Pacific Northwest is anticipated. The majority of the fish which will move into these waters will probably not arrive there until after mid-August. Laurs and his staff estimate that approximately 75% of the catch will be taken south of San Francisco and 25% in waters to the north of San Francisco.

Results from research studies at the Southwest Fisheries Center in recent years indicate that albacore which are fished by the U.S. albacore fleet off the Pacific Northwest are a separate substock from those fished south of about Cape Mendocino and that the two substocks follow different migratory patterns. The "northern" substock of albacore makes trans-Pacific migrations between the eastern and western North Pacific, resulting in an exchange of fish between the U.S. fishery north of Cape Mendocino and the Japanese pole-and-line fishery, and the Japanese longline fishery west of 180°. The "southern" substock of fish appears to make migrations between the eastern Pacific and the central Pacific and is fished on by the U.S. fishery south of about Cape Mendocino and the Japanese longline fishery east of 180°. Only a very small proportion of the southern substock of fish appears to migrate from the eastern to the western Pacific to enter the Japanese pole-and-line fishery. Also, during a given season there is very little exchange of fish between the northern and southern substocks off the coast of North America.

Based on such factors as the locations of recoveries of tagged albacore by Japanese longline fishermen in the eastern Pacific during December 1979 and January 1980, the late departure of fish from Morro Bay at the close of last season, and the sporadic catches of albacore made incidentally to other fishing off Baja California during this past winter, Laurs and his staff believe that the southern substock of albacore did not migrate as far into the central Pacific during the 1979-80 winter as it did during the previous winter. This, coupled with

existing favorable oceanographic conditions, indicates that albacore should be available in the waters off northern Baja and southern California by early July. Also, based on the prevailing deep mixed layer depths and warm sea surface temperature conditions off southern California, the researchers believe that, in general, fish will be found closer to shore this year than in 1979.

Laurs estimates that the main body of the albacore will be late in arriving in waters of the Pacific Northwest because of an apparent delay in the timing of migration from the western Pacific. This is indicated by the late and slow start of the Japanese pole-and-line fishery for albacore in the western Pacific. However, after a slow start, the Japanese fishery improved markedly about mid-May of this year and expanded eastward to about 160°E by early June. Also, U.S. jig boats that departed the west coast of the U.S. and Hawaii reported substantial catches slightly east of the dateline at the beginning of the second week in June. Ocean frontal conditions at the boundaries of the North Pacific Transition Zone, which influence the migration and availability of albacore, appear to be weakly developed in portions of the North Pacific. These oceanic frontal conditions could result in the fish being somewhat scattered and also contribute to the fish being late in arriving in waters off the Pacific Northwest. If warm water conditions prevail this summer off the Pacific Northwest, this, along with the expected late arrival of fish, could result in considerable numbers of albacore moving into waters off Canada.

Sea surface temperatures have been abnormally high during the 1979-80 winter off much of the west coast of North America between about the tip of Baja California and Vancouver Island, British Columbia and extending offshore to about the Hawaiian Islands. Upwelling along most of the west coast of the U.S. was markedly below normal during the winter of 1979-1980, which in part was responsible for the above normal sea surface temperature conditions along the coast.

The staff of the Albacore Fisheries Investigations at the La Jolla Laboratory will issue albacore advisory information throughout the 1980 season. The advisory information will include sea surface temperature charts, narrative albacore fish bulletins, and daily broadcasts of albacore fishing information over marine and commercial radio bands. The broadcasts will be made twice daily on weekdays and once on Saturday mornings from July 14 through October 31, or until the albacore season ends. Nearly coast-wide reception of the albacore fishery advisory broadcasts will be available again this year.

* * * * * * * * * *

Dr. R. Lasker, leader of the Coastal Fisheries Resources Division, represented Dr. I. Barrett at the U.S./Mexico bilateral fisheries meeting

held at the State Department, June 9-10. Discussions concerning anchovies took up part of the agenda, and a request was made by the U.S. delegation to convene a scientific meeting in the near future concerning anchovies. The Americans hope that the Mexicans will agree to a common anchovy biomass procedure. Lasker discussed research vessel clearances in Mexican waters with Francisco Del Rio and Victor Solano of the Mexican Ministry of Exterior. Mexican procedures were explained in greater detail, and Lasker anticipates that work clearance for the NOAA research vessel, David Starr Jordan in the CalCOFI sampling zone can be expedited.

LARVAL FISHES, COASTAL EAST PACIFIC

Experiments Continue to Increase Prey Density in Larval Fish Tanks

In laboratory studies of larval fish feeding ecology, it is vital to have larval food organisms randomly distributed in the feeding containers since many larval fish life functions depend on prey density. Generally, an increase in prey density increases larval feeding rates, ration and growth rates, and decreases activity, evacuation time and time to metamorphosis.

Most zooplanktonic and phytoplanktonic prey tend to form aggregations in unmixed rearing systems, causing areas of high and low prey concentration. Use of air stones in rearing containers mixes prey adequately to maintain random food concentration, but for young, delicate larvae, airstone mixing is too violent. Thus, experimental rearing of most young larvae is usually accomplished in static systems, where the concentration of prey encountered by the larval fish is virtually unknown.

As a prerequisite to planned experiments on feeding ecology of young northern anchovy larvae, Fishery Biologist Gail Theilacker and Richard Kiy, NOAA Junior Fellow, are trying to devise a "gentle" food-mixing method using a heat differential to cause convective mixing in the rearing containers. In the test tank, hot water is piped through a tube attached to the tank bottom and spiraled around the circumference; the rearing tank stands in a cold water bath.

To assess mixing, Theilacker and Kiy seeded the control and test tanks with a naked, 50μm dinoflagellate, Gymonodinium splendens, known to promote growth in anchovy larvae. Twenty-four hours after seeding, 12 50-ml samples were taken in both tanks, four each at the surface, mid-depth, and bottom. Two to five replicate microscopic cell counts were taken from each sample. Sample densities in the control tank usually ranged from 90 to 440 cells/ml; cell densities in our best test tank experiment (n=10) were between 160-270 cells/ml.

According to Theilacker, this success, although encouraging, needs some qualifying. Although "gentle" mixing has been achieved, the heat differential needed for sufficient mixing to occur produces a tank temperature of 22°C which is too warm for temperate species. Plans are to maintain the same temperature differential by decreasing the heat input and the cooling bath temperature. It is expected that this procedure will decrease the resulting tank temperature.

Scientists Complete Description of Anchovy Birthrate Distributions

Richard Methot, Scripps Institution of Oceanography graduate student, assisted by Technician Susan Longinotti, has completed a description of the birthdate distributions of the 1978 and 1979 anchovy year classes. He and Roger Hewitt, NOAA Officer on detail to the La Jolla Laboratory, have described the temporal distribution of spawning in these two years using CalCOFI larva survey data.

In November 1978, juvenile anchovy collected north of Point Dume averaged 90.7 mm in length and 78% of these fish were born before March 1978. Fish collected south of Point Dume were more abundant, averaged 77.7 mm in length, and 51% of these fish were born in March and April. Larva abundance peaked in March and decreased more rapidly in the north.

In November 1979, juvenile anchovy collected north of Point Dume averaged 90.5 mm in length and 84% of these fish were born before March 1979. Southern fish were much more abundant, averaging 80.7 mm in length, and had a broader and earlier birthdate distribution than the 1978 year class. January-March contained 60% of the birthdates. The abundance of larvae was much more evenly distributed over time than in 1978. As in 1978, spawning decreased sooner in the north.

Work on Paper Concerning Larval Anchovy Food Progresses

Dr. R. Owen, Oceanographer, worked on a manuscript, "Microscale patchiness of small plankton on the Chimbote shelf, Peru." The manuscript describes variation of larval anchovy food on 20 cm sampling intervals, which occurred under a variety of environmental conditions encountered on a Canada-Peru study of the Peruvian anchovy ecosystem (in November 1977). Significant microscale variation occurred under conditions that indicated vigorous mixing in subsurface layers near the Peru coast and offshore near the Chimbote shelf-break as well as at the sea surface at mid-shelf. This occurrence shows that anchovy larvae encounter small patches of food even when mixing is in progress.

Lee Inness-Brown, assisting Owen in the microscale studies, continued his microscope enumerations of plankton which was sampled by small-mesh nets at 20 and 40 cm intervals on the modified micro-patch sampler in the Southern California Bight. Carol Kimbrell began to process,

check and reformat MPS data for an extensive computer analysis of micro-scale sampling in coastal anchovy environments off California and Peru.

COMMERCIAL AND RECREATIONAL FISHERIES RESEARCH FOR MANAGEMENT

Report Prepared on 1979/80 Anchovy Fishery

Dr. D. Huppert. Task Leader, and J. McMillan, Economist, have prepared a 19-page report for the Pacific Fishery Management Council on the 1979-80 anchovy fishery, summarizing the catch, fleet size, capacity and fish stock biomass. McMillan contacted all the reduction processors in the State, as well as fishermen's organizations and CF&G personnel, to acquire information. Following is a summary of the findings:

The total California landings of anchovy for reduction were 35,424 tons, compared to the quota of 156,400 tons, the lowest seasonal landings in eleven years. In the Monterey fishery, 2,330 tons were landed, all during the months of October, November and December. Extremely good squid fishing coupled with the lucrative fishery in San Francisco Bay attracted most of the fishing effort away from the Monterey anchovy fishery.

In the southern permit area (south of Point Buchon), the Port Hueneme anchovy fishery accounted for the majority of the fall landings, while the San Pedro fleet landed most of the fish in the spring. 8,047 tons were harvested before the season closure of February and March, and 25,047 tons were landed in the spring fishery, for a total of 33,094 tons landed in the southern area. Reasons for the low anchovy landings include exceptionally good fishing for the higher priced Pacific mackerel, general unavailability of anchovies in areas traditionally fished during the fall off San Pedro, and large amounts of sub-legal (under 5 inches) fish in June. The non-reduction fishery took 3,947 tons of anchovies between August 1 and May 30; 3,413 tons for live bait and 534 tons for fresh fish, frozen fish and dead bait.

Mexico's anchovy reduction fishery took a record quantity, 208,000 tons, in 1979. However, the 1980 landings to May are substantially lower than in recent years. An exceptionally good sardine fishery in the Sea of Cortez distracted boats from the Ensenada anchovy until May. For unknown reasons, the six to eight purse seiners based in Ensenada have not been active through May 1980.

There have been minor changes in fleet composition and in processing capacity in the anchovy reduction fishery. Approximately 20 vessels landed anchovies in San Pedro, and five in Port Hueneme this season, as compared to the 25-35 vessel fishing anchovies in recent years. A new, 120-ton capacity purse seiner, the first to be designed expressly for the San Pedro wetfish fleet, fished for the first time this season.

Only one processor plans to increase reduction capacity, from 13 tons/hour to 15 tons/hour. In the Monterey fishery, only four vessels participated in the anchovy fishery, two purse seiners based in Monterey and two salmon purse seiners from the Puget Sound area, which were in the area primarily to participate in the herring fishery. There are up to 25 lampara boats and five purse seiners in Monterey Bay that could potentially participate in the anchovy fishery if fish were readily available in the area. One of the two processors in the Monterey area has decided to close down its reduction line and plans no longer to take anchovies. The remaining Monterey processor has sufficient capacity to handle reduction of anchovies in that area.

Detailed Review of Comments on Anchovy Plans Compiled

D. Huppert, A. MacCall and G. Stauffer have completed a detailed review of comments which were submitted by the Scientific and Statistical Committee of the Pacific Fishery Management Council, and by Dr. G. Murphy of CSIRO, Australia, through A. Nizetich of Star Kist Foods, Inc. The authors have reported their work in two documents; "A Review of Technical Issues in the Anchovy Management Plan" and "Conclusion and Recommendations of the Anchovy Fishery Management Team to the Pacific Fishery Management Council." The first is an extensive technical report while the second is a "plain English" summary.

The issues reviewed fall into five categories: 1) bias in the larva index method of anchovy biomass estimation; 2) the relationship of the anchovy stock to the ecosystem; 3) assumptions behind the anchovy population model; 4) alternative optimum yield formulas; and 5) use of recruitment or age-structure data to update biomass estimates and modify harvest quotas during the fishing season. The suspected bias in larva census estimates was found not to be present; no new information was available regarding the anchovy-sardine or predator-prey relationships; and the assumption of a maximum equilibrium biomass equal to 3.8 million tons was evaluated. Of interest regarding alternative quota formulas was a proposal to allow some reduction fishery (with quota equal to between 10 and 20 percent of the biomass) when the estimated biomass falls below 1 million tons. The modified quota formula were shown to be less sensitive to the biomass estimate, and to yield catches and economic returns equivalent to those achieved under the existing quota policy.

Incorporation of a mid-year recruitment estimate was investigated by experimentation with a fishery simulation model (see March 1980 Monthly Report). As a modification to the existing biomass-based quota formula, the recruitment estimate was found to cause very little improvement in average catch (25 thousand tons per year at most) or in economic yield ($100 to 200 thousand per year at most). The value of a recruitment estimate as a replacement for the biomass estimate remains to be investigated. The general conclusion of the anchovy management team is that no significant amendment to the plan is needed now.

Egg-Trawl Survey Data Analyzed for Estimating Anchovy Spawning Biomass for 1980

Sue Picquelle and Gary Stauffer completed the analysis of the egg-trawl survey data from the Jordan cruises, 8003 and 8004, for estimating the anchovy spawning biomass for 1980. Based on the work estimates, variances were calculated for each parameter of the egg production equation for spawning biomass, B, i.e.

$$B = \frac{k_1 \, k_2 \, PW}{RFE}$$

where k_1 = surface area of ocean over which P is estimated (units of 0.05 m^2),

k_2 = conversion factor for grams to short tons,

P = daily egg production in the sea per unit surface area (0.05 m^2),

W = average weight of mature female anchovy in grams,

R = fraction of females in the anchovy stock based on fish weight,

F = fraction of day-1 post-ovulatory female fish in the mature female portion of the stock,

E = batch fecundity per fish for mature females in eggs per fish.

From the distribution of anchovy eggs in the CalVET samples, the central subpopulation was assumed to be contained within a 36,000 nm^2 area. This area extends from Point Conception to Point Baja and includes the outer boundary of the Southern California Bight. The estimate of daily egg production was 10.27 eggs per tow (or 205.4 eggs/m^2). The trawl data yielded estimates of 17.5 grams for average female weight, 0.476 for sex ratio, and 0.145 fraction of females spawning per day. This last number corresponds to a spawning frequency of once per week, which is similar to values estimated by Hunter for 1978 and 1979. The batch fecundity per spawning was estimated at 7,788 eggs per fish. These parameter estimates and variances are summarized in the attached table. The resulting estimate of spawning biomass is 924,000 short tons. The standard deviation of this estimate is 205,000 tons which implies a 95% confidence interval of ±44% if the biomass estimate has a normal distribution.

Table 1. Values of conversion constants and parameter estimates ($\hat{X}$) with associated variances ($V_{\hat{X}}$), standard deviations ($SD_{\hat{X}}$), and coefficient of variation, ($CV_{\hat{X}}$), for 1980 spawning biomass estimate.

Constant or parameter	$\hat{X}$	$\hat{V}_X$	$SD_{\hat{X}}$	$CV_{\hat{X}}$
k_1	2.508×10^{12}	-	-	-
k_2	1.102×10^{-6}	-	-	-
P	10.27 eggs/tow	1.125	1.061	0.103
W	17.50 grams	0.918	0.958	0.0547
R	0.476	3.24×10^{-3}	0.0569	0.120
F	0.145	3.30×10^{-4}	0.0182	0.125
E	7788.0 eggs/female	3.40×10^{4}	583.1	0.749
$\hat{B}$	924,100 short tons	4.20×10^{10}	205,000	0.222

Oceanic Fisheries Resources Division

TUNA AND BILLFISH RESOURCES PROGRAM

Study of Atlantic Tuna Maturity and Fecundity Completed

Fishery Biologist Hillary Herring-Dyal, La Jolla Laboratory, and Dr. Stephen Goldberg of Whittier College have completed a study of the fecundity and maturation of bigeye tuna (Thunnus obesus) and yellowfin tuna (Thunnus albacares). The samples were taken by Japanese longliners in the Gulf of Mexico and the eastern North Atlantic, and collected by NMFS observers from the Southeast Fisheries Center's Pascagoula Laboratory.

The investigation addressed the hypothesis that the populations under study undergo a brief spring spawning period. All of the fish examined were captured during the late summer and early winter months of 1979-79. All ovaries were in a regressed state, and showed no signs of the vacuolization that typically occurs prior to the beginning of yolk disposition, which indicates a new spawning cycle. The absence of follicular atresia, a process in which follicles undergo degeneration, suggests that ovaries have been reproductively inactive for several months. Most testes examined were regressed, shown by masses of residual sperm left in several males, a typical sign of regressed testes. The level of sperm formation (spermatogenesis) was greatly reduced from that expected during peak spermatogenesis.

Document Prepared for the 5th North Pacific Albacore Workshop

Earl Weber, Fishery Biologist, La Jolla Laboratory, has completed a draft document on "An Evaluation of Fishery Indicators for North Pacific Albacore (Thunnus alalunga)." The paper describes a study of the status of North Pacific albacore stocks, based on trends in catch, catch rates, effort levels, mean weights and age structure of the catch. Fluctuations in intra- and inter-fishery year class strength are also discussed, as well as functions of interactions between fisheries. The paper will be presented at the 5th North Pacific Albacore Workshop, to be held at the La Jolla Laboratory from June 30 to July 3, 1980.

Center Scientists Prepare Sampling Manuals for ICCAT

Fishery Biologist Ronald Rinaldo and Mathematician Al Coan are preparing field and laboratory sampling manuals for the Commission's International Skipjack Year Program. The three manuals, which include a Port Sampling Manual, a Shipboard Sampling Manual, and a Laboratory

Manual will be standardized so that the data collected by different program participants will be consistent and complete. Rinaldo and Coan have completed a draft Port Sampling Manual, and expect to finish the others by August 1, 1980.

Bluefin Tuna Data Base Established at the La Jolla Laboratory

California Department of Fish and Game Biologist Doyle A. Hanan is working with SWFC personnel to assemble a complete set of bluefin tuna data from CF&G and SWFC files. The data includes tag releases, tag recaptures, catch and effort, landings, number and sizes of boats, sizes of fish caught and fishing areas for the approximate dates between 1957-1972.

Files of the CF&G are being reviewed and two data sets have been identified. The first data set consists of catch and effort data from logbooks for the period 1957 through 1969. The second concerns data collected by CF&G Bluefin Tuna Project and used in CF&G's internal reports.

Bluefin tuna files at the SWFC are also being reviewed. These files contain some tagging information and catch data. In addition to editing, coding and proofing of the data, a major literature search for bluefin tuna material has begun. More than 100 references have been cataloged and relevant papers collected.

Tuna Vessel Participation in FAX Advisory Program

During May 1980, 25 tuna seiners contributed synoptic weather data to the NMFS FAX Advisory Program. A total of 229 weather observations were reported via NMFS-licensed radio station WWD. The table below lists program participation during May 1979 and 1980.

	May	
	1979	1980
Number of vessels with equipment	46	45
Number of vessels reporting	23	25
Number of weather observations reported	210	229
Number of XBT observations reported	9	0
Total observations	219	229

Leading all program participants in May were the captains and crews of the Jo Ann and Cheryl Marie. We wish to thank these and all other contributors.

MARINE MAMMAL ASSESSMENT AND MONITORING PROGRAM

Soviet Scientists Participate in Coastal Marine Mammal Survey

A second sighting survey of California coastal marine mammals began June 17, 1980, aboard NOAA vessel David Starr Jordan. Scientists plan to survey along predetermined tracks from the tip of Baja California to the California-Oregon border, seaward to approximately 200 miles, in order to collect seasonal distribution data complementary to a similar cruise last October. The cruise has a six-person sighting team and, in addition, two Soviet scientists, Dr. Alfred Berzin of TINRO in Vladivostok, and Dr. Valery Mineev of the Ministry of Fisheries, Moscow, are participating in the cruise as part of a U.S.-U.S.S.R. scientific exchange of information on marine mammal sighting methodology.

U.S. Marine Mammal Commission Reviews Coastal Marine Mammal Program

The Marine Mammal Commission reviewed plans for the Center's coastal marine mammal program in the Oceanic Fisheries Resources Division. The overall one-day presentation was well received and directions for future research were discussed.

Polar Bear Workshop Assisted by Dr. Douglas DeMaster

Operations Research Analyst Dr. Douglas DeMaster participated in a workshop, June 18-20, dealing with Polar Bear Population Modeling, sponsored by the Northwest Territories Wildlife Service in Yellowknife, Canada. The workshop attempted to identify various analyses of harvest data that would indicate the impact of a regulated harvest on polar bear stocks. DeMaster described a type of least squares analysis formerly proposed by Dr. Dan Goodman, Scripps Institution of Oceanography. DeMaster also led a discussion concerning the use of K and P indexes to quantify the fluctuation in carrying capacity of a stock under exploitation.

MARINE MAMMAL BIOLOGY AND TECHNOLOGY PROGRAM

Stranded Beaked Whale Identified as Uncommon Species

A beaked whale that washed ashore on December 26, 1979 at Torrey Pines State Reserve, San Diego County, has been identified as Hector's Beaked Whale, Mesoplodon hectori. The specimen, a juvenile male, was recovered by fishery bilogist John Henderson, Leader of the Marine

Beaked Whale, Mesoplodon hectori. The specimen, a juvenile male, was recovered by Fishery Biologist John Henderson, Leader of the Marine Mammal Salvage Project, and Biological Technician Larry Hansen. The animal was sent to the Smithsonian Institute and identified last month by Dr. James Mead, Curator of Marine Mammals.

Beaked whales occur in deep, offshore waters and are not easily recognizable at sea. Most of the scientific knowledge of these animals has come from beached animals, and any stranding of a Mesoplodon is a noteworthy event. This most recent specimen is particularly important, however, as it is only the fourth specimen of this species recovered in the northern hemisphere. The other three specimens were recovered by SWFC personnel from a 40 km section of beach in San Diego County (two from Camp Pendleton Marine Corps Base, one from Carlsbad, and this specimen) since 1975.

The "sudden" appearance of this species in such a temporal and geographically parochial range, after being known previously only from strandings in the southern hemisphere, may represent a genuine extension of the known range for Hector's Beaked Whale.

Fishing Methods and Gear Discussed

Fishery Biologist Jim Coe returned from Europe on June 18 after 2-1/2 weeks in Denmark, Norway and England. There he discussed research on fishing gear and methods technology, and shared preliminary results of a computer simulation model dealing with fishing gear behavior, developed by SWFC with European scientists. In Copenhagen, Coe attended the World Fishing Exhibition at the Bella Centre. He met with sales persons and engineers representing diverse companies that produced ropes and twine, sheet netting, cables, floats, fishing nets, propulsion systems and deck machinery for a broad range of fisheries. The exhibition was followed by a two-day tour of the fishing ports of the western Jutland penninsula, which included vessels, fish handling and processing facilities and harbor facilities in Hanstholm, Hirtshals, Skagen and Saeby.

Coe traveled to the Norwegian Fisheries Technology Research Institute laboratory in Trondheim, where the vessel and marine engineering division is located, and to the fishing gear and methods division in Bergen. In Trondheim he met with Dr. Anders Endal to discuss seine net handling machinery, vessel design and engineering for energy efficiency. In Bergen, Coe worked with Dr. Steinar Olsen and Arvid Beltestad on research methods for purse seine development and design. He found that the Norwegians employ research methods similar to SWFC, but that their instrumentation is more sophisticated and their goals more pragmatic. For example, they have developed and introduced hexagonal mesh webbing in purse seine nets for mackerel, capelin, saithe and herring.

Coe then traveled to Hull, England to visit the White Fish Authorities' Industrial Development Unit, where net modeling work and fishing

skipper training are carried out. There he spoke with Mr. David Wileman about the scaling laws and assumptions necessary to build and test model fishing nets. Mr. Wileman provided valuable information to improve the efficiency and accuracy of present and future model net work at SWFC.

Coe reported that the information exchange and contacts resulting from his trip will be used to further the SWFC research efforts in gear modification, to reduce incidental porpoise mortality in the tuna purse seine fishery.

Satellite-Linked Radio Tracking Experiments Completed

Tests aimed at determining the precise surfacing times of spotted dolphins (Stenella attenuata) were conducted in Kona, Hawaii in May by Fishery Biologist Jacqueline Jennings and Biological Technician Ray Stives of the La Jolla Laboratory. First, a spotted dolphin was captured. Then a prototype satellite-linked tag with a substitute radio unit was attached to the animal and the animal released. The animal was tracked with an aircraft and vessel. Preliminary analysis of data from radio telemetry and photography indicates that the length of time the antenna is totally exposed and clear of splashes resulting from the animal's movement is not long enough to transmit the entire message required for the NIMBUS-6 satellite, i.e. 980 msec. However, there is sufficient time for transmission of the basic message of 360 msec to the TIROS satellite. Alternative antenna designs are being considered to reduce splash interference that reduces the usable time by 50%.

Satellite-Linked Transmitters Pass Acceptance Tests

On June 16 the factory acceptance test of the two transmitters designed for use with NIMBUS were successfully completed. These will now be available for tests of alternative antennas. The test was conducted at the contractor's facility, SCI in Huntsville, Alabama. Attending the tests for NMFS were Jacqueline Jennings, SWFC, Walt Gandy, FEL, and Hank Fallek, SWFC's consultant from HANDAR.

First Year of Data on Tetracycline Labeling of Dolphin Teeth Indicates Lunar Rhythms

Dr. Al Myrick, Leader of the Marine Mammal Age Determination Project, has analyzed the first full year's data from tetracycline labeling of 12 bottlenose dolphins (Tursiops truncatus) carried out under contract with Hubb's Sea World Research Institute. Results indicate that for a given year in each animal of the same age, the teeth deposit a single layer of the same thickness. However, the thickness of the layer varies by age class and decreases with increased age at a uniform and predictable rate that is species specific. The first seven or eight annual layers each

contain 13 sublayers that correspond in time to lunar months. Tetracycline marks show that dentine and cemental layers are deposited on a one-to-one basis. In old adults dentine deposition ceases, but cemental layering continues. The ability to calibrate dentine and cementum with real time permits, for the first time, maximum age determination for older bottlenose dolphins. Back-counting of lunar layers from date of death to the beginning of the dentinal tissue permits an accurate determination of the date of birth within two months. Tetracycline marks produced in animals immediately after birth confirm tht the point of parturition is represented by the external-most edge of the neonatal layer (a landmark in the tissue). Layering rates are unaffected by changes in nutrition, water temperatures or salinities, or ill health (except for serious prolonged illness). Changes noted in rates of accumulation within teeth of each year class are probably controlled endogenously, triggered by length of day from season to season. Rate of deposition is highest in the late spring-summer, decreasing in August and reaching a low of 2/3 the summer rate in winter toward early spring.

Studies of Layering Rates in Teeth of Hawaiian Spinners Progress

Wildlilife Biologist Al Myrick reports progress in retrospectively determining the layering rates in teeth of Hawaiian spinner dolphins. The dolphins were held captive at Sealife Park, Hawaii for up to 8 years, while scientists attempted to determine the layering rate with flourescent labels produced by therapeutic treatments of vibramycin. Althoug the layers deposited within these animals of a given age class are less thick than the layers deposited in bottlenose dolphins of the same age, the rate of deposition tissue in one year for each specimen is the same, and the layer reduces in thickness at a uniform rate according to the age of the animal. Sublayers corresponding to lunar months have been detected in the first 6 annual layers and have been used to correctly predict the month of birth of a Hawaiian spinner born in captivity. The layering pattern in Hawaiian spinners resembles that of spinners and spotters from the eastern tropical Pacific. The method of back-calculating lunar ages in captive spinners is being applied to tooth samples from juvenile spotter and spinners caught in the eastern Pacific in order to determine month of birth and, by inference, effective breeding season. Cemental layers calibrated with dentinal layers in captive spinners are being used to determine longevity, ovulation rates, and age at sexual maturity and sexual senescence.

Chemistry of Dolphin Blood Studied for Indications of Capture Stress

Biological Technician Thomas Shay completed an analysis of serum chemistry parameters in five captive Hawaiian spinner dolphins. The experiment was designed to obtain baseline blood values for Stenella for use

in continuing capture stress studies. Important considerations are artificial variations caused by hemolysis, recent feeding and disease. An anaylsis of the effect of hemolysis has shown a significant increase in bilirubin and lactic dehydrogenase (normally found in red blood cells).

Hemolysis also seems to contribute to increased variation in other serum constituents. Some parameters seem to decrease due to increased dilution by red cell contents, while others are moderately elevated.

PACIFIC ENVIRONMENTAL GROUP

FAO Workshop Influences Eastern Boundary Current Studies at PEG

Drs. Richard Parrish and Andy Bakun report that their participation in the IMARPE-FAO workshop held in Callao, Peru April 12 to May 5 has benefited the eastern boundary current studies, which are the main focus of the Fishery/Environmental Modeling and Forecasting Task at the Pacific Environmental Group. The workshop dealt with the effects of environmental variation on the survival of eggs and larvae of pelagic fishes. Afterward, participants agreed that a "state-of-the-art" one-dimensional oceanic mixed layer model offers the best available approach for integrating available knowledge concerning environmental effects with larval "first-feeding" success.

In terms of the PEG program, the value of planned comparative studies of eastern boundary current systems was affirmed. The opportunity for discussions with IMARPE personnel in Peru, and with Chilean researchers during Dr. Parrish's following visit to Santiago, has provided much biological insight into Peru Current fishery dynamics. However, it appears that much of the oceanographic input necessary for an effective comparative study will have to be developed at PEG, from data available at Fleet Numerical Oceanographic Center and other sources.

Preliminary comparisons with the California Current system indicate highly suggestive similarities and differences. Tentative findings include the following:

Equivalent magnitudes of wind-induced local upwelling would generally be accompanied by greatly reduced wind-generated turbulent mixing in the Peru Current situation. This reduction, caused by lessened Coriolis effect related to the proximity to the equator, might enhance larval feeding success;

The major spawning areas of the stocks, which provide the basis for both the Californian and Peruvian anchovy fisheries, appear similar in their location within areas characterized by concave coastline, positive wind stress curl resulting in surface layer divergence, and poleward flow near the coast against the larger scale, generally equatorward, eastern boundary current flow;

The California Current system may tend less toward anchovy dominance, due to the greater ability of adult sardines to migrate from the spawning region south of Point Conception to the region of maximum upwelling off Northern California. Off Peru the upwelling and spawning regions appear to coincide, perhaps favoring the more weakly swimming anchovies.

In the California Current region, exploitation of sardine stocks appear to have contributed to a change from a sardine-dominated system to an anchovy-dominated system. Off Peru, a heavily exploited anchovy-dominated system appears to have given way to sardine dominance. In both regions the supplanting stock is presently being exploited. It is not known if the collapse of the supplanting stock leads to renewed dominance of the supplanted stock, or to an altered situation in which the system's productivity is channeled toward neither anchovy nor sardine biomasses.

TIBURON LABORATORY

FISH COMMUNITIES INVESTIGATION

Current Year-Class of Rockfishes on Northern Californian Coast Appears Weak

Based on the exceptionally strong upwelling along the northern California coast during the past spring, Dr. Edmund S. Hobson, Leader of the Fish Communities Investigation, and Fishery Biologist Tony Chess, had predicted that relatively few juvenile rockfishes would settle out of the plankton this summer in their Mendocino study site. So far, this prediction has proven accurate. By late June last year (see monthly Report for July 1979), vast numbers of juveniles had settled in the near-shore habitats--in particular blue rockfish (Sebastes mystinus), but also black rockfish (S. melanops), yellowtail (S. flavidus), canary (S. pinniger), and bocaccio (S. paucispinis). By late June this year, however, only a few have settled, with the lesser numbers of blue rockfish being most apparent. Significantly, there are relatively more mixed-species groups this year than last, when segregation by species was clearly evident among the much greater numbers present then.

Results of Rockfish Sampling Show Strong Year-Class of Bocaccio Produced in 1977

Tina Echeverria, Fishery Biologist with the Rockfish Analysis Task, reports that about 250 samples--comprising about 3,100 fish--have been sampled during the first theee months of the six-month rockfish sampling project. Results of the samples taken from Morro Bay, California to the Oregon border still indicate that the 1977 year-class of bocaccio is quite strong. Sample processing continues to occur within about two weeks of the collection date.

Study of Interactions Between Anchovies and Brown Pelicans Completed

Dr. William H. Lenarz, leader of the Rockfish Analysis Task, presented his report on possible interactions among brown pelicans, northern anchovies, and the northern anchovy fishery at a meeting that took place at the California Department of Natural Resources Building in Sacramento, California, June 27, 1980. The brown pelican, a familiar bird along the California coast, is an endangered species. It was placed on the list because of reproductive failures in nesting colonies of southern California and northern Baja, California around 1970, caused by

thin egg shells due to pesticides. Elimination of major sources of DDT and its derivatives has alleviated most of that problem. Because the pelican is an endangered species and feeds heavily on northern anchovies, management of anchovies must take into consideration any impact on the pelicans. Lenarz was asked by the Southwest Region to examine available data for evidence of interactions among pelicans and anchovies.

The results of his study, although not statistically significant, indicate that there may be a relationship between pelican nesting success and the abundance of anchovies as measured by CALCOFI larvae surveys, and a correlation between nesting success and the availability of anchovies, as measured by aerial spotter observations. Since the number of observations is low, Lenarz recommended continued monitoring.

FISHERIES DEVELOPMENT INVESTIGATION

Local Fisheries Development Projects Continue

Octopus traps are being built by Lieutenant Patrick Rutten, NOAA officer on detail to the Tiburon Laboratory, for use in northern California. The first fishing and processing trials should occur in late July. Several markets are available for octopus, depending on size and species. Rutten will attempt to provide products for each of these markets in order to learn how the developing fishery can be most successful.

Another fishing trip is being planned aboard the trawler San Giovanni II, to catch euphausiids off Monterey, California. Fishery Biologist Daniel Ralph will test alternate methods of preserving the catch aboard the vessel, to learn if the quality and quantity of the final product (freeze-dried euphausiids) can be improved. Ralph will also participate in a survey cruise aboard the NOAA research vessel Miller Freeman, assigned to the Northwest and Alaska Fisheries Center, from July 14-27, 1980. While aboard the vessel, he will collect and freeze a ton of shortbelly rockfish needed for market surveys.

PHYSIOLOGICAL ECOLOGY INVESTIGATION

Summary Presented of Field Studies on Striped Bass

One hundred years ago (1879), 332 juvenile striped bass from the Navesink River on the East Coast of the United States were released into the San Francisco Bay-Delta estuary of California. Over the

intervening years, sport and commercial catch records have indicated considerable fluctuations in the Pacific striped bass population. To determine the causal mechanisms controlling these fluctuations, California Department of Fish and Game (CDF&G) has conducted extensive studies on the California striped bass and their habitat. The CDF&G field data indicate that mortality during the first 60 days after hatching determines the size of the adult population. Survival to "young-of-the-year" juveniles is related to river outflow and diversion volumes in the Sacramento-San Joaquin River Delta.

In 1978 Dr. Jeanette Whipple and her team of researchers initiated field-laboratory studies on the effects of selected inherent factors, such as the condition of spawning adults and their genotypes on gametic viability of eggs. Previous research at Tiburon on effects of aromatic petroleum hydrocarbons showed that fish during spawning condition were extremely sensitive to short, low-level exposures. There were also subsequent deleterious effects on survival and growth of eggs and larvae from exposed females. In the spring of 1978, samples of pre-spawning adult striped bass were collected off Antioch, California on the San Joaquin River both during their upstream spawning migration and after they passed through the heavily industrialized Carquinez Straits area. Post-spawning adults were collected in San Francisco Bay near the Tiburon Laboratory.

Complete autopsies were performed and subsamples taken for various measurements. The samples were used to determine the condition of parental fish just prior to spawning, to ascertain whether certain measures of parental condition correlated with measures of gametic viability, and to identify factors which might relate to the annual "fish kill" of adult striped bass in the Carquinez Straits during the summer.

Initial results indicated that fish were generally in poor condition and heavily burdened with pollutants and parasites (some pathogenic to man). Because of these results, it was proposed to continue research on the probable long term chronic impact of pollutants on the striped bass population. The program at Tiburon was funded for FY 79 from the Marine Sanctuaries Act 202 through the Office of Marine Pollution Assessment.

Research results from a total of 300 fish collected during 1978-1979 indicate that pre-spawning fish, their gonads and gametes, and post-spawning fish are being deleteriously affected during their migration through the San Francisco Bay-Delta estuary, and that the degree of this effect is determined by interaction of the parental genotype with environmental stress factors, including pollutants.

This spring was the third year of striped bass collection from the San Francisco Bay estuary, under additional funding from the Marine Sanctuaries Act 202 for FY 1980. Findings of the Tiburon scientists

have generated considerable interest among the State agencies and the general public. This year, with the coooperation of the State Water Resources Control Board, sampling was extended to additional times and areas, including a comparative sample from the Coos River, Oregon. Although efforts were made to sample the less-polluted Umpqua and/or Smith Rivers, no fish were captured from these areas.

Results of the Oregon samples are presently being analyzed. Generally, the fish exhibit a few characteristics differing from the San Francisco Bay population, including hermaphroditism. On initial examination, it appeared that the hermaphroditic Oregon fish were also parasitized. However, Dr. Mike Moser, Institute of Coastal Marine Studies, University of California, Santa Cruz, found no parasites on the fish, and the cause of the observed connective tissue responses is as yet unascertained. Non-hermaphroditic fish from Oregon contained few macroscopic parasites, and differed significantly from the San Francisco Bay fish in that they contained few macroscopic parasites or none at all.

Fish collected from the San Joaquin and Sacramento Rivers during their pre-spawning migration this spring continued to show relatively high levels of parasitism and poor condition. Data analyzed so far for approximately 90 fish) show 57% of the fish with levels of parasitism causing organ and tissue damage, and 37% with lesions (most healed or healing in order fish). Approximately 15% of the females and 5% of the males showed extensive damage to gonads. The condition of many fish and their eggs was poor. Some fish showed extensive visceral adhesions related to the healed lesions and also associated with high levels of parasitism. Some of these parasites are pathogenic to man (e.g., anasakids).

Subsamples taken for pollutant analyses were extended in 1980. Samples of muscle, liver, and gonads were taken for every fish and tested for petrochemicals, heavy metals, and PCB's. Additional subsamples were taken for analyses of the 129 EPA priority pollutants, and further gas chromatography-mass spectrometry by the SWRCB.

Heavy metal analyses of liver and gonad samples for fish collected in 1978 and 1979 continued. Additional analyses for mercury were made. These data will be reported when all samples are completed.

Petrochemicals, primarily bezene and alkylated benzenes, occur in liver and gonad tissue (up to 10 ppm was in liver) and this class of compounds appears to be one of the major groups of pollutants found in the San Francisco Bay striped bass. Mass spectrometry verification of samples for benzene and toluene in striped bass tissues was accomplished.

Preliminary PCB analysis of muscle showed that smaller fish probably do not have levels dangerous to man. Larger fish are now being analyzed. Recent data from Dr. Donald Gadbois, Gloucester Laboratory (personal communication), show that high levels of PCB's occurred in ovaries of small pre-spawning females, and relatively high levels in liver tissues (up to 13.0 ppm and 19.0 ppm, respectively). PCB analyses will continue with additional fish of different sizes sampled at different seasons.

Dr. Mike Moser has been given samples of fish collected during 1979 and has begun identification and quantification of the parasite assemblage in striped bass. His results support previous conclusions that roundworm larval parasites often occur at levels harmful to the fish. He has also found that cestode larvae cause damage to ribs in some fish. Samples have been sent to experts on various parasitic species, e.g., copepods, and tissue samples have been made into slides for identification of parasitic damage to organs and tissues. The analysis of data on parasitism is proceeding and data is being entered on coding sheets. Samples taken in 1980 will also be identified, and further work on identification of possible bacterial and viral infections and the causes of lesions will be pursued.

Whipple noted that she is in the process of hiring a new biologist-chemist, specializing in toxicology and biochemistry to pursue studies on pollutant effects on hormones. Many of the secondary physiological effects observed appear to be related to hormones and steroid metabolism.

The examination of several blood parameters is continuing as they appear indicative of the physiological condition of the fish, and because some pollutants may damage hemopoietic organs and blood cells. Differential blood cell counts and examinations of white blood cells continue to show many fish with possible abnormal conditions. Tissue sections and kidney and spleen prints are being examined as well. The assessment of serum protein variation is continuing. Effects on blood are observed, but data analyses are as yet incomplete.

A complete set of photographs of different blood cell types and blood conditions in different fish has been taken. Each type of cell is being described, as no complete description of blood cells in striped bass is available. The blood cells are also being studied to note variability among different life history stages, sexes, etc.

Samples of several tissues and organs from fish collected in the field and from fish used in laboratory exposure experiments have been made. Dr. Sefton Wellings, University of California, Davis, is in the process of determining criteria for assessing

tissue damage in the tissues that will be examined in relation to all other parameters measured for each fish, including pollutant load. Tissue slides have been made for light microscopy of the following organs/tissues: liver, spleen, kidney, adrenal gland, ovaries, testes, and other tissues. Initial examinations by Wellings indicate that tissue damage is present in both field-captured fish and fish exposed in experiments. Additional samples of suspected tumors are being collected and will be studied with electron microscopy.

The analyses for fish collected from 1978-present are proceeding, with additional data for 1978 fish being added, which will be reanalyzed within the next two months. Analyses of 1979 fish should be mostly complete by December, and that of 1980 fish by next spring. Covariance analyses of related sets of variables (factors) are also being run. All computer programs necessary to complete analyses are available and have been tested.

Several parameters being measured indicate a strong correlation between pollutant load and physiological condition and gametic viability of the fish. Sample and data analyses are being completed. Field sampling will be discontinued by NMFS and assumed by the SWRCB, and NMFS will concentrate on laboratory studies, samples analyses and planning of experiments to test selected pollutants (in varying conditions) on fish in the laboratory.

SOUTHWEST REGIONAL DATA MANAGEMENT AND ADP OPERATIONS

Fishery Information Network (FIN) Agreement Signed

The Fishery Information Network agreement has been signed by the Southwest Fisheries Center and the State of Hawaii, Department of Land and Natural Resources, Division of Fish and Game. The agreement sets forth the terms and activities which will be supported and actively pursued in a project known as the FIN. The project will improve fisheries data collection in order to accommodate the information needs of the State of Hawaii, SWC, Southwest Region, and the Western Pacific Management Council which was established under the Fishery Conservation and Management Act of 1976.

The SWC is providing Hawaii with funds to conduct a system study which will serve as the framework for future improvements. The system study will determine how the present Hawaii system of commercial fisheries catch reporting can be more responsive to State, Federal, Western Pacific Fisheries Management Council, industry and the general public's fisheries information needs. The study will also recommend alternatives to the State system through changes in policy, methods, and procedures or through acquisition of personnel equipment.

New PACES System Initiated in Computer Program Training

Bob Butler gave training classes in Long Beach on June 16, in Menlo Park on June 18, and in San Diego to SWR and CF&G enforcement personnel on the Pacific Area Cooperative Enforcement System (PACES) on June 25. Several additions were made to PACES programs and documentation because of changes that were requested by enforcement personnel. Enforcement personnel started using a new version of the PACES on June 16, 1980.

GSA to Explore Possibility of Merging Fisheries Data

General Services Administration (GSA) is under contract, through the Southwest Fisheries Center, to analyze the feasibility of merging west coast fishery catch data that will be transmitted by the various west coast states and NMFS for fishery managers. GSA will present the different alternatives that are available to the Pacific Marine Fisheries Commission (PMFC) Committee on Data Goals and Guidelines in Los Angeles on July 8, 1980. At this meeting, the committee will determine which computer system should be utilized as the central processor for the west coast fishery information network.

Anchovy Biomass Programs Modified

Butch Burris, Computer Programmer, modified the anchovy biomass programs for the run of the 1980 larval data. New selection values were given for dates of samples and regional areas to be included: years of coverage 1951 through 1980, dates February 15 through March 31, April 1 through May 15 and regions 7, 8 and 9. Runs were made for the 1951 through 1979 and all programs modifed and tested.

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SWFC Updates Computer Systems

Lt. Mark Sullivan, NOAA Officer assigned to the Southwest Fisheries Center ADP group, reports in June that Jack Cole of Card C Systems and Software will be working on the North Star/ORION (Oceanographic Research Interactive Onboard Network) contract. This contract is to develop data transfer operating systems on the Center North Star micro computer and to update the ORION operating system.

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Research Vessel's Computer System Primed for Work

Mike Webb of the ship electronic group in Seattle had the RV David Star Jordan CAMAC (Computer Automatic Measurement and Control) system running Friday, June 20. He left a spare CAMAC for the development and testing of programs at the La Jolla Laboratory. Both Jordan CAMAC and the laboratory CAMAC had hardware problems, and the laboratory CAMAC was sent back to Seattle for the problem to be researched.

Newest addition to NOAA's research fleet, the Chapman is moored at Nimitz facility during recent stop in San Diego.

Warren Taguchi, skipper of the Chapman in wheelhouse of vessel.

MISCELLANEOUS

NOAA RESEARCH VESSEL CHAPMAN CALLS AT SAN DIEGO: VESSEL CAPTAIN IS FORMER NOAA OFFICER AT SOUTHWEST FISHERIES CENTER

The newest vessel in NOAA's research fleet, the 127-foot, white-hulled, Chapman arrived in San Diego on June 29, enroute from the shipyard in Mobile, Alabama, where it was built, to Seattle, Washington. The event was of more than casual interest to the staff of the Southwest Fisheries Center.

The ship is named after Dr. Wilbert McLeod Chapman, a dynamic marine biologist who pioneered the concept of international fishery management before his death in 1970. Among his other accomplishments, Dr. Chapman is also credited with lobbying Congress to pass the federal appropriation for the construction of the $2.5 million dollar Southwest Fisheries Center in 1963.

Dr. Chapman received his Ph.D. in fisheries in 1937 from the University of Washington. He began his career in fisheries as a fishery biologist with the State of Washington, later serving as the University of Washington's Director of the School of Fisheries. He was a leader in international tuna management and served as special assistant to the Under Secretary of State. He was Director of the Division of Resources of Van Camp Seafood Company, and director of Marine Resources for Ralston Purina Company.

Commander Warren Taguchi, the Captain of the Chapman, was the first National Oceanic and Atmospheric Administration Officer ever assigned to the Southwest Fisheries Center. He served a tour of duty here from 1973-1975, working with scientists in the program on porpoise/tuna interaction. Another tie to the Center is the Executive Officer of the Chapman, Lt. Dale Bretschneider, who recently completed an assignment as the NOAA officer attached to the Pacific Environmental Group at Monterey, California.

According to Taguchi, the Chapman will be used for fisheries research from Seattle to the Gulf of Alaska and the Bering Sea. Although the ship looks superficially like a stern trawler, it carries more than a half-million dollars worth of electronics and computers, and is considered one of the most modern fishing research vessels in the United States. The vessel has a 6000-mile cruising range, a speed of 11 knots, and a full load displacement of 520 tons. The Chapman carries three officers, eight crew and six scientists.

R. Kiy

F. Jacques

La Jolla Laboratory Continues to Endorse REGY Program

1980 marks the sixth year of the SWFC's participation in the Regional Youth Employment Program (REGY). REGY is an organization that specializes in providing meaningful, supervised employment experience for high school students from low income backgrounds. Students at the SWFC work four days a week through the summer at laboratory tasks matched to their particular career interests. This summer, three REGY students have been placed at the La Jolla laboratory. They are Hung Do, 19, who will be working under the supervision of Dr. Elizabeth Clarke, sorting and processing data samples collected from the Bering Sea; Curt Allen, 15, who will serve in the Marine Mammal Program under the direction of Priscilla Sloan, working on the porpoise fetus collection and preparation; and Bao Nguyen, 17, who will assist in curating the larval fish reference collection for the Multispecies Taxonomy Task, under the supervision of Betsy Stevens.

Richard Kiy and Frank Jacques Awarded 1980 NOAA Junior Fellowships

Dr. Izadore Barrett announced the selection of Richard Kiy, 17, and Frank Jacques, 18, as recipients of the 1980 National Oceanic and Atmospheric Administration (NOAA) Junior Fellowship at the La Jolla and Tiburon Laboratories.

Son of Teresa and Derek Kiy of San Diego, California, Kiy graduated from Crawford High School in June of 1980. An honors student who has also conducted independent research in marine biology at San Diego State University, Kiy has won a scholarship to Stanford University, where he plans to continue his studies in the marine sciences.

This summer, Kiy will be working with Fishery Biologist Gail Theilacker who is currently conducting experiments to determine the critical amount of food larval fish need to survive when they are first born. Kiy will assist in rearing the larval fish, designing experiments and culturing organisms for the fish to feed upon. The experiments are designed to help develop a standard method for determining fish populations.

Frank Jacques, son of Elizabeth and Raymond Jacques, graduated from Sir Francis Drake High School in June 1980. An honor student who has received numerous awards for scholarship as well as art and sports, Jacques will be attending Humbolt State College in the fall, where he plans to continue his studies in wildlife and biology.

He will spend this summer working under the direction of Fishery Biologist Dr. Edmund S. Hobson, who is conducting a study of predator/prey relationships in coastal fish communities. Jacques' work includes working with fish samples under the microscope, determining the stomach contents of the animals and cleaning, sorting, arranging and sketching the laboratory samples.

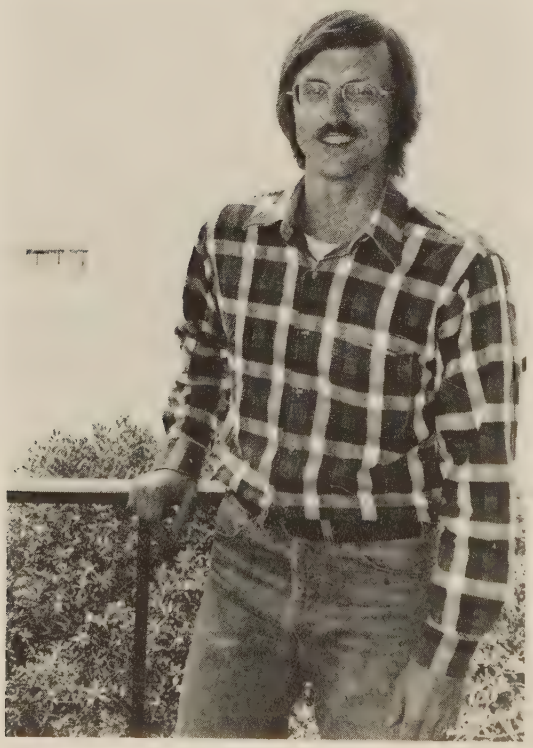
Nominations for the NOAA Junior Fellowship program are requested from local high schools during March and April of each year. According to Barrett, the program is designed to interest talented students in working for NOAA upon their graduation from college. During their undergraduate college years, the Fellowship program provides students with an opportunity to work in NOAA research laboratories in the summer after high school graduation and during college vacations.

Eric A. Lynn, Federal Women's Program Manager
at the Southwest Fisheries Center

Appointed as the Federal Women's Program Manager by Dr. I. Barrett, Lynn's principal duty is to assist and advise the Director and Deputy Director in implementing an Equal Employment Opportunity program specifically pertaining to women at the Center. According to Lynn, a Federal Women's Program is required by the EEO Act of 1972 for any agency that employs 100 or more people.

With the concurrence of the Director, Lynn plans to put together during the coming year a statistical analysis or profile of the work force of women at the Center. He also wants to form a Women's Program Committee to assist him in identifying problems of concern to women and to plan special programs of interest to women.

Lynn, 34, began work at the Center in January, 1977 as a Biological Technician with the Coastal Fisheries Resources Division. His present job is to provide live food organisms, mainly through culturing techniques, for use by biologists in rearing larval fishes. He is a graduate of the University of Ohio in biology, and has had extensive experience as a microbiologist. In 1978, Lynn received an Incentive Award for his innovative changes in developing the culture of algae, rotifers, and copepods. Largely through his efforts the system now produces 4-5 times more rotifers than when he began work, using half the volume of algae and one-third less work space.



Eric A. Lynn

New Science Writing Intern at La Jolla Laboratory

This month the Southwest Fisheries Center has accepted a new Science Writer/Intern, Michele Winkler, in conjunction with the science writing program at the University of California at Santa Cruz.

UCSC's unique science writing program teaches students majoring in the natural sciences how to communicate scientific concepts to a lay audience. An essential part of the program has been the use of on-the-job internships in addition to classroom training. Through these internships, Science Writing students have served at many organizations including the California State Legislature, the State Energy Commission, the Sea Grant College Program and the T. Wayland Vaughn Aquarium at Scripps Institute of Oceanography, Sea World, and here at the Southwest Fisheries Center.

Winkler is a senior student majoring in biology. She has published several fiction and science articles both locally and nationally, assisted in editing and writing campus publications, and has served as a senior writing tutor on the Santa Cruz campus. She has just finished a six-month internship in the Education Department at Sea World, working under the supervision of Pat Murphy, a former science writing intern at the La Jolla Laboratory.

For the next three months, Winkler will be working under the direction of Lillian Vlymen, the Center's Technical Writer/Editor. Among other projects, she will assist Vlymen in writing brochures for the forthcoming open house in October, editing and popularizing scientific articles for publication, and editing and preparing the Center's monthly report.

SEMINARS

Honolulu Laboratory

June 13 - Dr. Linda L. Hudgins, Economist, spoke on "Economics of a fisheries market with endogenous supply; the Hawaiian skipjack tuna case."

La Jolla Laboratory

June 3 - Dr. Michael Orbach, Associate Director, Center for Coastal Marine Studies, University of California, Santa Cruz, spoke on "An Overview of Social and Cultural Factors in Fisheries Management in the Pacific Region."

June 10 - Dr. Roy Mendelssohn, Southwest Fisheries Center, Honolulu Laboratory, discussed "Forecasting Tuna Catch and Effort in Hawaii."

30 - Dr. Jeannette A. Whipple, Chief, Physiological Ecology Program, Tiburon Laboratory, conducted a seminar on "An Approach for the Study of Chronic Pollution Effects on Fishes Using Striped Bass as a Model Species."

PUBLIC AFFAIRS

June 6-8 - Sus Kato and Lieutenant Patrick Rutten, (NOAA Corps) attended the Fishermen's Festival at Santa Barbara, California. They set up an informational booth describing fishery development activities, and worked with John Richards of Sea Grant, and a local 4-H Chapter, to provide samples of fish cake made from Gulf croaker. Must people liked the taste and texture of the deep-fried fish cake. Over 5,000 persons attended the Festival.

June 14-15 - Hillary Herring-Dyal, Fishery Biologist, and Roy Allen, Illustrator, were the representatives of the Southwest Fisheries Center at the Equal Employment Opportunity, Career Planning and Job Fair at the San Diego Convention Center, June 14-15. Renee Fair, Meteorologist, Dell Baier, Personnel Specialist, Pat Robinson, Transportation Specialist, all from Washington, D.C., and NOAA Corps Commander Jefferies from San Francisco, completed the staff at the NOAA booth.

People with backgrounds in science, technology, economics, and business administration flocked to the NOAA booth with questions on job availability and employment opportunity. Procedures used to obtain federal employment were explained in detail. Pamphlets describing various career options as well as booklets on the mission of NOAA and guides on obtaining employment with NOAA were disseminated. A register of people who visited the booth and expressed an interest in NOAA was established so that more detailed information could be sent to them.

PRESS RELEASE

June 18 - Issued by the Honolulu Laboratory - "Southwest Fisheries Center Employee Selected for International Wheelchair Games."

VISITORS

Honolulu Laboratory

June 3 - Augustus Naruo, Marine Resources Division, Koror, Palau, visited T. Otsu.

5 - Dr. Ron Nolan, Ocean Research Consulting and Analysis, - Ltd. (ORCA), visited R. Shomura.

6 - Dr. Gerald Marten, East-West Center, met with R. Shomura.

17-20 - Dr. J. Marcille, ORSTOM, Noumea, New Caledonia, who was enroute hone from La Jolla, visited the Honolulu Laboratory. He met with R. Shomura and T. Otsu on June 17 and was given an overview of the Laboratory's research program. He also met with Walter M. Matsumoto to discuss the fish aggregation buoys, met other staff members to discuss various research projects and spent some time in the library.

18 - Garden Harger, Acting Director, National Weather Service, Pacific Region, and Albert Mark, Director of Public Affairs, NOAA, were given a tour of our Kewalo Research Facility by S. Hendrix, R. Chang, and R. Uchida.

20 - R. Chang conducted a tour of the Kewalo Research Facility for Sam Seuk Lee, Principal Research Scientist; Sang Jeong Park, Oceanography Section; Young Cha Ahn, Fishing Boat and Gear Section; and Yeoung Seung Kim, Environmental Research Section, all of the Fisheries Research and Development Agency, Pusan, Korea.

23 - Dr. Weinstein visited with R. Shomura to discuss their mutual friend Christer S. Friberg, Principal Fisheries Officer, Cook Islands.

La Lolla Laboratory

June 13 - Dr. Francis S. L. Williamson, NSF, Washington, D.C.

16 - Messrs. Stuart Hill, Kaisar Majid, and Edward Betty of SAI, Randolph, Maine

June 16 - Drs. A. A. Berzin, TINRO, Vladivostok and V. N. Mineev, GLAVRIBROD, Moscow

18 - Jon Sutinen, Associate Professor of Natural Resource Economics, University of Rhode Island.

24 - Sang Jeong Park, Oceanography section of the Fisheries Research and Development Agency, Pusan, Korea

24 - Youn Cha Ahn, Fishing Boat and Gear Research Section, Fisheries Research and Development Agency, Pusan, Korea

24 - Sam Souk Lee, Principal Research Scientist, Biological Oceanography, Fisheries Research and Development Agency, Pusan, Korea

19 - Dr. Stephen Goldberg, Whittier College, Biology Department, Whittier, California

24 - Francis Ho, NOAA, National Weather Service, Silver Springs, Maryland

27 - Chris Moors, Department of Oceanography, Naval Postgraduate School, Monterey, California

Tiburon Laboratory

June 2 - Steve McDonald, Survival Training, Mill Valley, CA

3 - Steve Schultz, California Department of Fish and Game, Fort Bragg, CA

10 - Tom Jow, California Department of Fish and Game, Menlo Park, CA

- Al Millikan, Washington Department of Fisheries, University of Washington, Seattle, WA

11 - Meryl Cohen, San Francisco State University, San Francisco, CA

- Phillip A. Meyer, University of California, Davis, CA

- Norris Millikan, Bay Conservation and Development Commission (BCDC), San Francisco, CA

- Jim Swanson, California Department of Fish and Game, Yountsville, CA

- Craig Vassel, Environmental Protection Agency, San Francisco, CA

17 - Larry L. Carlson, Commercial Fisherman, Brookings, OR

- Harry S. North, Corte Madera, CA

- Rachel Parker, Long Beach, CA

- Bruce Wyatt, Santa Rosa, CA

18 - Orrin F. Deland, San Francisco State University, San Francisco, CA

- Morgan J. Griffiths, San Francisco State University, San Francisco, CA

- Dennis Mishek, Regional Water Quality Control Board, Oakland, CA

- Susan Pollock, San Rafael, CA

- Ben Remington, Southwest Fisheries Center, La Jolla, CA

- Eddie Tate, NASO, Seattle, WA

- Dwight T. Taylor, Tiburon Center for Environmental Studies, Tiburon, CA

19 - John R. Hunter, Southwest Fisheries Center, La Jolla, CA

- Dan Huppert, Southwest Fisheries Center, La Jolla, CA

- Richard Parrish, Pacific Environmental Group, Monterey, CA

- F. I. Burke, Tiburon, CA

24 - Paula Berlawca, Petaluma, CA

- Steven E. Hanson, Port of Oakland, Oakland, CA

- Mrs. Norma M. Higgins, Oxnard, CA

- Hank Kammermeier, Port of Oakland, Oakland, CA

- Wallace D. Mersereau, Port of Oakland, Oakland, CA

- Donald Miailovich, Corps of Engineers, San Francisco, CA

26 - Paul Youmt, Hong Kong

27 - Rita Castellano, San Francisco State University, San Francisco, CA

- Stan Gallagher, San Francisco State University, San Francisco, CA

- Hideo Ichinose, ABS Fishing Company, San Francisco, CA

- Alida N. Solis, Conservation Task Force of the Oceanic Society (San Francisco Bay Chapter), San Francisco, CA

- Fred Thalheimer, San Francisco State University, San Francisco, CA

30 - Robert Berger, Lawrence-Livermore Laboratory, Livermore, CA

- Dave Rice, Lawrence-Livermore Laboratory, Livermore, CA

Pacific Environmental Group (PEG)

June 4 - Floyd Anders, Southwest Regional Office, Terminal Island, CA

19 - Admiral H. Nygren, NOAA Corps, Washington, D.C.

MEETINGS AND MANUSCRIPTS

Honolulu Laboratory

June 3 - R. Shomura returned to Honolulu from Japan after 1) participating in the 19th session of the Indo-Pacific Fishery Commission and 2) meeting with faculty members of the University of Hokkaido to discuss squid research.

16 - R. Shomura and William G. Gilmartin attended a breakfast meeting convened by Robert DeLong, Northwest and Alaska Fisheries Center at the Pagoda Hotel to discuss results of monk seal research on Lisianski Island. Others at the meeting were Alvin Katekaru, Hawaii Division of Fish and Game, Eugene Nitta, Western Pacific Program Office, and Dr. Robert Shallenberger, U.S. Fish and Wildlife Service.

17 - R. Uchida and Howard O. Yoshida attended a meeting of the spiny lobster plan development team in the conference room.

17-20 - R. Shomura and W. Gilmartin traveled to California to attend the Marine Mammal Commission meeting in La Jolla, California.

La Jolla Laboratory

June 2-5 - LCDR W. Perryman, NOAA Officer, traveled to New London, Connecticut, to inspect AT11 aircraft for use in porpoise field experiments.

2-5 - Dr. M. Laurs was in Monterey, California to present a seminar at the Naval Postgraduate School and to make a presentation at the SEASAT Users' meeting.

6-10 - D. Mackett traveled to McLean, Virginia to attend an NMFS Planners' Workshop.

May 26-June 8- Drs. G. Sakagawa and W. Parks attended a meeting of the International Commission for the Conservation of Atlantic Tunas juvenile tropical tuna working group. Both subsequently attended a meeting of ICCAT's Skipjack subcommittee in Brest, France. Dr. Sakagawa was the convenor of the skipjack subcommittee.

8-10 - Dr. R. Lasker represented the Director of the Southwest Fisheries Center at the U.S./Mexico bilateral meeting in Washington, D.C.

9-11 - Dr. T. Smith assisted in the final presentation of the NOAA position at the tuna/porpoise hearings in Washington, D.C.

11 - D. Huppert, A. MacCall, J. McMillan, and G. Stauffer were in Long Beach to confer with the California Department of Fish and Game Biologists on anchovy biomass and the fishery.

13-19 - J. Jennings traveled to Huntsville, Alabama, to Bay St. Louis, Missouri and to Phoenix, Arizona to participate in the Factory Acceptance Test of the prototype satellite-linked transmitter in Huntsville and to present results of the Hawaiian experiment to place a radio transmitter pack on a wild porpoise.

15-18 - R. Holt traveled to Davis, California to present a paper at the WNHR Biometric Conference.

15-18 - Dr. I. Barrett traveled to Wood's Hole, Massachusetts to attend the NMFS Center Director's meeting.

15-19 - Dr. M. Laurs was in Knoxville, Tennessee to present papers at the American Society of Limnology and Oceanography meeting.

16 - R. Butler, in Long Beach to present a training class on the PACES system to California Department of Fish and Game and Southwest Region enforcement personnel.

16-17 - D. Huppert, J. McMillan and C. Thomson attended a meeting of the Western Economics Association in San Diego.

17-20 - Dr. W. Perrin traveled to Washington, D.C. and to Bay St. Louis, Missouri to attend an interagency meeting on International Whaling Commission strategy and to attend a review at the National Fishery Engineering Laboratory.

18 NOAA Officer Mark Sullivan was in Long Beach to participate in a Fishery Information meeting with California Fish and Game personnel.

May 31-June 18 - Fishery Biologist James Coe traveled to Copenhagen, Denmark to Bergen, Norway and to Hull, England to attend the World Fishing Exhibition and to visit fishery technologists at the Norwegian Institute of Fishery Technology and to visit the White Fish Authority's Industrial Development Unit.

23-25 - Dr. G. Sakagawa was in Atlanta, Georgia to attend a meeting of the Menhaden Population Dynamics Subcommittee.

23-27 - F. Kellenberger was in Los Angeles to meet with California Department of Fish and Game on data management activities and to attend a course on interactive computer graphics.

25-26 - Dr. Barrett was in Sacramento, California to discuss scientific and administrative matters with the Acting Regional Director, Southwest Region.

27 - Dr. G. Stauffer was in Sacramento to attend a Southwest Regional Pelican/Anchovy meeting.

Pacific Environmental Group

June 18-20 - Dr. Richard Parrish traveled to Tiburon, CA to attend a meeting of the SWFC Coastal Fisheries Program Planning Technical Committee.

Tiburon Laboratory

June 2 - Nancy Wiley traveled to the Southwest Fisheries Center, La Jolla, to attend a meeting of the Data Management Committee.

5 - Dr. William H. Lenarz traveled to the University of California, Davis, to confer with Dan Anderson on the Pelican/Anchovy Project.

10-11 - Edward Ueber chaired the Groundfish Management Plan Development Team Meeting held at the Tiburon Laboratory. Other members of the Groundfish Team who attended the meeting were: Larry Six, Pacific Fisheries Management Council, Portland, Oregon; William Clark, University of Washington, Seattle, Washington; Robert Demory, Oregon Department of Fish and Wildlife, Newport, Oregon; Tom Jow, California Department of Fish and Game, Menlo Park, California; and Allan Millikan, Washington Department of Fisheries, Seattle, Washington.

11 - Norman J. Abramson attended a meeting at the Tiburon Laboratory on the San Francisco Bay Institute.

12-13 - Sus Kato traveled to Moss Landing and Monterey, California, to meet with processors (DiGirolomo Fish Company, Consolidated Factors, and Royal Seafoods) and trawl vessel owners. The chief subject of discussion was alternative fisheries.

18 - A meeting on the Sewage Treatment Plant was held at the Tiburon Laboratory, primarily to discuss our Laboratory's sewage treatment facilities. Attendees included: Eddie Tate, NASO, Seattle, Washington; Ben Remington, Southwest Fisheries Center, La Jolla, California; Dennis Mishek, Regional Water Quality Control Board, Oakland, California; Dr. Erwin Seibel, Director, Tiburon Center for Environmental Studies, Tiburon, California; Dwight T. Taylor, Tiburon Center for Environmental Studies, Tiburon; Orrin F. Deland and Morgan J. Griffiths, San Francisco State University, and Norman J. Abramson and Walburga Giguere.

19-20 - A meeting of the Coastal Fisheries Research Planning Technical Committee was held at the Tiburon Laboratory to discuss the development of coastal fisheries research planning options. The meeting was chaired by Dr. Richard Parrish, Pacific Environmental Group, Monterey, California. Other committee members who attended the meeting included: Dr. John Hunter and Dr. Dan Huppert, Southwest Fishieries Center, La Jolla, California; and Dr. Edmund S. Hobson (Tiburon).

23-27 - Dr. Edmund S. Hobson traveled to Santa Catalina Island, California, where he and Dr. William N. McFarland, Cornell University, New York, continued their studies on the photic environment and vision in fishes as related to predatory behavior.

25 - Norman J. Abramson and Sus Kato met at the Tiburon Laboratory with Steven E. Hanson, Hank Kammermeir, and Wallace D. Mersereau, Port of Oakland, California, to discuss the development of commercial fishery facilities at that location.

- Dr. Jennette A. Whipple, Maxwell Eldridge, Pete Benville, and members of the Physiological Ecology Investigation staff attended the annual Pacific Division Meeting of the Association for the Advancement of Science (AAAS), University of California, Davis. Pete Benville gave a presentation on "Benzene Uptake and Depuration by Adult Striped Bass." The talk was authored by Pete E. Benville, Jr., Nina Hirsch (San Franciscon State University), and Jeannette A. Whipple.

27 - Dr. William H. Lenarz traveled to Sacramento, California, to present his report on "Possible Interactions Among Brown Pelicans, Northern Anchovies, and the Fishery on Northern Anchovies." The meeting was held at the California Department of Natural Resources Building.

30 - Tina Echeverria traveled to Avila Beach, California, to conduct port sampling of rockfish.

PERSONNEL ACTIONS

Honolulu Laboratory

15 - Nancy C. Green, Biological Science Student Trainee (NOAA Junior Fellow) - Appointment.

15 - Linda A. Barraclough, Summer Aid - Appointment

- Gayle K. Fujikawa, Summer Aid - Appointment

18 - Gordon W. Tribble, Biological Aid (Fisheries) - 700-hour appointment

20 - Linda L. Hudgins, Economist - Resignation, July 1, 1980

La Jolla Laboratory

May 29 - Robert W. Butler, Computer Programmer - Promotion

June 1 - Robert J. Nydam, Computer Programmer - Promotion

9 - Sandra Paez, Student Assistant - Adjustment to full time

15 - Richard Kiy, Biological Science Student Trainee - EOD

15 - Alice E. Doty, Secretary, Temporary Appointment

15 - Kenneth Raymond, Visual Information Specialist - Promotion

28 - Martin E. Johnson, Student Trainee - Adjustment to full time

Tiburon Laboratory

June 5 - Morden Dunn, Data Clerk - Temporary appointment

7 - Steven J. Pace, Biological Aid - Resignation

11 - Dennis Nakazono, Biological Aid - Resignation

13 - Stuart K. Running, Biological Aid - Resignation

15 - Pearl L. Bradley, Clerk-Typist - Reassignment to Tiburon from Auke Bay Fisheries Laboratory

16 - Frank Jacques, Junior Fellow appointment

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